REFERENCES

- Goodall, E. W. (1928). *A Textbook of Infectious Diseases*, 3rd ed. Lewis, London.
- Grantham-Hill, C. (1950). *British Medical Journal*, 1, 308.
- Price, F. W. (1947). *A Textbook of the Practice of Medicine*, 7th ed. Reading, P. (1950). *British Medical Journal*, 1, 105.
- Rolleston, J. D., and Ronaldson, G. W. (1940). *Acute Infectious Diseases*, 3rd ed. Heinemann, London.

Medical Memoranda

Contamination of Caesarean Wounds by Vernix Caseosa

The vernix caseosa, though one of the potential contaminants of the operative field in the caesarean operation, has for various reasons received as such little or no attention. Some of the neglect has been due to a belief that because the vernix is sterile it is therefore innocuous, some to a proper preoccupation with the problems of contamination by pyogenic organisms. That the vernix is not, however, an entirely innocuous contaminant is illustrated by the events that follow the rupture of an ovarian dermoid cyst. Such an accident, whether spontaneous, puerperal, or operative, is succeeded quite rapidly by a severe peritoneal reaction, and this usually in turn by a secondary invasion of the peritoneum by pyogenic organisms. Even a small amount of free sebaceous material may determine the reaction; in a recent case a severe lower abdominal peritonitis followed the rupture of a cyst no larger than a pullet's egg.

If the dermoid cyst that bursts is large, or if at operation much of the contents escape into the peritoneal cavity, a diffuse plastic peritonitis is certain unless a thorough cleansing is carried out at once. If any pockets of sebaceous material are left behind, then at the best the accident may be followed by the development of localized residual abscesses here and there throughout the peritoneal cavity, even under the diaphragm. Indeed, it may fairly be stated that a dermoid cyst is the one ovarian tumour which must not be tapped at operation.

Both the vernix caseosa and the contents of dermoid cysts, allied as they are in constitution, have similar properties as contaminants; both are unabsorbable and can be removed from the operation area only by a slow phagocytosis, a process carrying the certainty of adhesions and the chances of secondary infection. It seems likely that the escape of vernix into the peritoneal cavity or its inclusion in the abdominal incision is a potential cause of caesarean morbidity. This may be one of the reasons why caesarean section wounds seem more apt than others to heal by second intention; after a period of apparent healing by first intention pus is discharged from their lower end. On seeing an ugly caesarean scar it must be a common experience to draw the inference that the uterine scar must be equally unsound, an inference indeed almost expected from an examination candidate, yet to find at the repeat section that the secondary scar tissue is confined to the abdominal wall, the uterine scar itself being quite sound.

The amount of vernix soiling the operative field varies a great deal. For one thing the amount found covering the foetus varies for reasons that are as yet not understood. Again, the method by which the child is extracted has a bearing on the amount escaping into the wound. More escapes when the child is delivered by the breech or when

any difficulty arises in the extraction. Large flakes escaping into the operative field are of course readily seen and removed. It is, however, important to look for and remove the smallest fragments and to recognize the potential contamination coming from the vernix which adheres to the gloves and swabs. Inspection of the surface of water used for rinsing the hands or the swabs will often show a film of liquefied vernix. All these are sources of contamination.

Once the importance of vernix spill is appreciated, suitable precautions come readily to mind. Packing off the peritoneal cavity before the uterus is opened is not a real protection, for once the foetus is extracted these packs always lie loose. "Tetra" cloths as usually employed do not protect the deep layers of the incision. The real protection is twofold; (1) a change of gloves, swabs, and rinsing water immediately the uterine incision is closed and before the peritoneum covering the lower segment is sutured; and (2) a meticulous removal of every fragment of the vernix caseosa from the operative field, the most likely places being the front of the broad ligaments and the lower angle of the abdominal incision behind the rectus sheath. If a transverse abdominal incision is used a careful inspection of the recess behind the lower flap of the sheath should be made. It is well, too, to wipe all the raw surfaces with a clean swab before any attempt at closure.

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Pethidine as an Adjunct to Nitrous Oxide and Oxygen Anaesthesia

Mushin and Rendell-Baker, in 1949, published a memorandum on the use of pethidine as a supplement to nitrous oxide and oxygen anaesthesia, a method which they had seen used successfully in America and had themselves adopted on 100 occasions. It appeared that this method might well be a useful innovation, and such has proved to be the case in the 150 administrations here recorded.

METHOD

The method suggested by Mushin and Rendell-Baker was adopted and has been adhered to throughout this series, although they themselves have on occasion given increased doses of pethidine.

The routine in the present series has been as follows: (1) Premedication has been by "omnupon" 1/3 gr. (22 mg.) and scopolamine 1/150 gr. (0.43 mg.) for all adults between the ages of 17 and 60 years; over 60 years, omnupon 1/6 gr. (11 mg.) and scopolamine 1/300 gr. (0.21 mg.). (2) Induction has been by a "sleep" dose of sodium thiopentone—usually between 0.2 and 0.3 g. is given in 5% solution. (3) Anaesthesia is begun with nitrous oxide and oxygen. (4) Pethidine is given in a dose of 25 mg. intravenously as soon as anaesthesia is smoothly established. (5) Tubarine or "flaxedil" is given at the requisite time should there be any undue movements of the patient or should great relaxation of the muscles be necessary.

This routine has been the standard in all cases except three. Of these, two were tough farm-labourers, and each had to have 0.5 g. of sodium thiopentone followed by 37.5 mg. of pethidine. The third was a girl who received 0.5 g. of sodium thiopentone originally, as she was to be examined under an anaesthetic before operation was decided upon.

The following table shows the nature of the cases which were selected as suitable :

Cases in the Series

Hernia (inguinal and femoral) ..	31	Hydrocele ..	2
Orthopaedic ..	19	Nephrolithotomy ..	1
Mastectomy (simple and radical) ..	12	Cystotomy ..	1
Varicose veins ..	10	Gynaecological; abdominal (hysterectomy, ovarian cyst, etc.) ..	27
Cystoscopy ..	3	Vaginal hysterectomy ..	1
Prostatectomy (Millin's) ..	2	Vaginal repair ..	13
Appendicectomy ..	10	Dilatation and curettage ..	7
Haemorrhoidectomy ..	3	Laparotomy ..	1
Colostomy ..	4		
Gastrectomy ..	1		
Circumcision (adult) ..	2		

A start was made with minor extra-abdominal cases, and gradually the scope was widened as more experience and confidence were gained. The method has now been adopted as almost routine except for the more difficult upper abdominal cases, such as gastrectomy. One gastrectomy is quoted here, but was not a complete success owing to the mistiming of a further dose of flaxedil, which led to the peritoneum being insufficiently relaxed for easy suture.

GENERAL OBSERVATIONS

Patients seldom suffer any side-effects from the use of pethidine. In a few cases there has been a marked reduction in the frequency, although not in the volume, of respiration. In two cases the respiration was reduced to seven a minute, and in one case to three. Adequate ventilation was easily obtained by "assisted respiration."

It is sometimes a little difficult to maintain adequate oxygenation combined with sufficient depth of anaesthesia during the earlier stages of the operation, but this is overcome by waiting a few minutes, allowing time for the patient to become stabilized on nitrous oxide, and giving an increased percentage of oxygen.

No significant alterations of blood pressure have been recorded as due to pethidine.

One outstanding feature is that apparently the sphincter ani becomes sufficiently insensitized to allow of such operations as haemorrhoidectomy and posterior colporrhaphy to be done without alteration in the patients' respiration and without any evidence of distress.

It is a little difficult to judge at what interval of time pethidine begins to exert its maximum effect, but probably this varies between five and ten minutes, as judged by the incidence of reflex movements when under the anaesthetic. It is possible that the more prolonged administration of nitrous oxide affects this estimate. It has not been found necessary to repeat the dosage of 25 mg. of pethidine at intervals of 25 to 30 minutes, and the effect of a single dose has been known to last up to 1½ hours.

Recovery is rapid, often occurring in the theatre, and almost always on the way back to the ward. Patients will almost immediately open their eyes upon request and will answer questions, but there is a varying period of amnesia lasting up to 1-1½ hours.

Another valuable point is that post-operative pain seems to be considerably reduced, and patients operated upon in the morning often do not require any post-operative sedative until late in the evening.

The present series is not large enough for the incidence of pulmonary complications to be judged accurately, but they have been remarkably few, and it is felt that this may largely be due to the reduction of immediate post-operative pain and the consequently increased movements of the patients.

The series reported is small, and further investigation is proceeding, but it was felt justified to publish results up to date in order to stimulate interest in a method which

appears to be safe and also promises improvingly good results as more experience is gained in its use.

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REFERENCE

Mushin, W. W., and Rendell-Baker, E. (1949). *British Medical Journal*, 2, 472.

Post-pneumonic Collapse of Right Lower Lobe Relieved by Bronchoscopic Aspiration

Atelectasis of the whole lung or of one lobe, whether post-operative or post-pneumonic, is considered to be due to bronchial obstruction. The sequence of events in either case is very much the same : (1) Production of excessive secretion. (2) Formation of occluding masses because of the recumbent position and reduced respiration through splinting of diaphragm and pain. (3) Movement of these masses upwards in the tract by ciliary action, somewhat on the principle of a ball-valve, allowing air to get out during expiration but preventing air getting in during inspiration. The shape of the bronchus being narrower in its distal portion than proximally explains how a plug of mucus can act in that manner. (4) Progressive shrinkage of the affected lobe takes place (aided by absorption of air into the blood stream) as the plug of mucus becomes immobilized by atmospheric pressure.

Whereas *post-operative* collapse and relief by bronchoscopic aspiration has been extensively reported, I could find mention of only two cases of *post-pneumonic* collapse relieved in this way (Mainzer, 1931). I therefore venture to report the following case.

CASE REPORT

A married woman was admitted to the French Hospital on February 24, 1949, with a 10-day history of post-influenzal cough. Her temperature was 103° F. (39.4° C.) and pulse 120.

Physical examination showed dullness at the base of the right lung, which was opaque on x-ray examination. A diagnosis of lobar pneumonia with small pleural effusion was made by Dr. L. P. E. Laurent. Penicillin injections in full doses were given. The patient became afebrile and improved generally, but the dullness on the right side remained. X-ray examination four weeks after admission revealed a solid lower lobe with the diaphragm drawn upwards and the heart pulled to the right. The physician and the radiologist now began to suspect a neoplasm blocking the inferior bronchus.

The patient was referred to me, and bronchoscopy was carried out on March 29. The right main bronchus appeared congested, the entrance to the inferior bronchus was patent, and no neoplasm was seen. A bronchoscopic sucker was then introduced about an inch beyond the entrance to the lower lobe. While aspirating and withdrawing the sucker at the same time, a thick gelatinous, tenacious mucous plug was seen adhering to the distal end of the sucker. The patient's relief was almost immediate.

Within a few days physical examination showed some return of pulmonary function. Successive radiographs revealed the lobe expanding gradually, the diaphragm descending, and the heart resuming its normal position. Tomograms confirmed the absence of a neoplasm. The patient left hospital on May 2, having made a complete recovery.

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REFERENCE

Mainzer, F. S. (1931). *Amer. J. Surg.*, 12, 430.